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(54) **SYSTEMS AND METHODS FOR ADVERTISING CONTINUITY**

(57) Methods and systems are described for generating content identification files, such as manifest files, for ensuring content and advertising continuity when changes occur during playback. A user device can request content at a particular bitrate, and a first manifest file comprising references to the content and selected associated content such as advertisements can be created in response to the request. While one of the advertisements is being displayed, the user device can request

a change, such as for a different bitrate. A computing device, such as a manifest server can access the first manifest file to determine the content and the associated content, such the advertisements, that were intended for the user. The manifest server can then create a second manifest file in response to the request, where second manifest file can be created with the associated content, for example, the advertisements in the first manifest file.

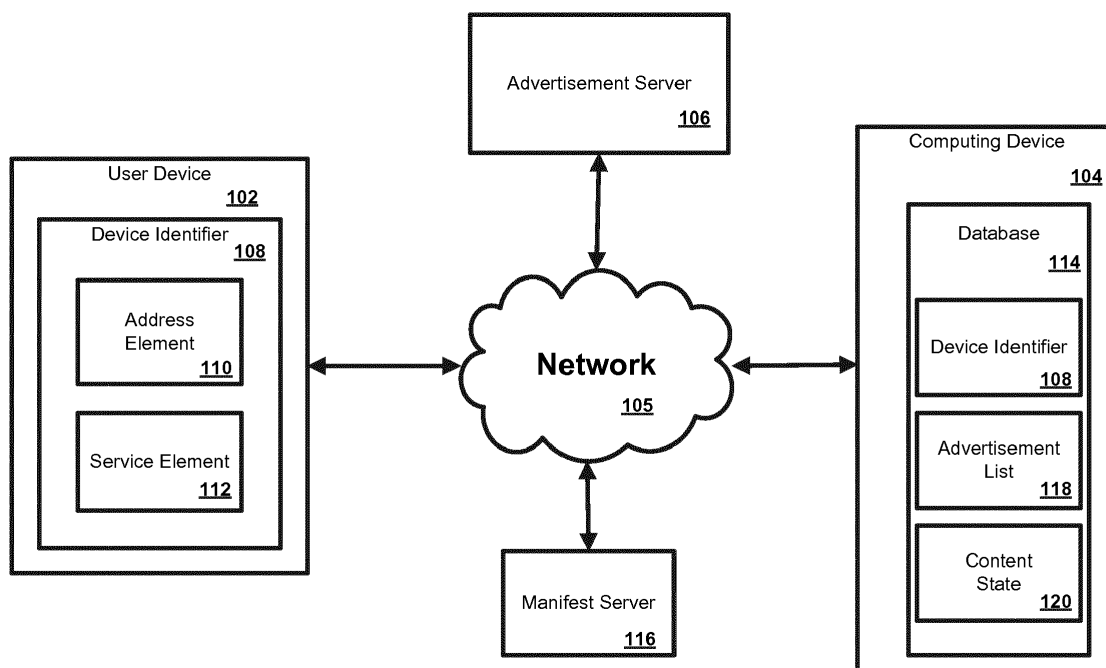


FIG. 1

Description

BACKGROUND

[0001] Internet Protocol (IP) video can be delivered at different bitrates. A device receiving an IP video stream can request a change in the bitrate of the video stream. If the IP video stream is currently displaying an advertisement, a different advertisement, corresponding to the newly requested bitrate will interrupt the currently displaying advertisement at the old bitrate, causing a negative impact on the user experience. What is needed is a way to transition between bitrates mid-advertisement while maintaining continuity. These and other shortcomings are addressed by the present disclosure.

SUMMARY

[0002] It is to be understood that both the following general description and the following detailed description are exemplary and explanatory only and are not restrictive. Methods and systems are described for ensuring continuity with segments of content. For example, the methods and systems described herein can be used to ensure advertising continuity. In an aspect, a user device can request content at a first bitrate. The content request can comprise an identifier associated with the user device. In response to the content request, an advertisement server can generate an advertisement list and deliver the advertisement list to a manifest server. The advertisement list can comprise one or more advertisements that can be displayed during consumption of the requested content. The manifest server can transmit the advertisement list and the identifier associated with the user device to a central computing device. The manifest server can create a first manifest file comprising instructions for acquiring the requested content at the first bitrate and the advertisements in the advertisement list at the first bitrate. The first manifest file can be transmitted to the user device and the user device can use the first manifest file to acquire and playback sequential video fragments of the requested content and advertisements at the first bitrate. In an aspect, the user of the user device can request the content at a second bitrate that is different from the first bitrate. The manifest server can access the advertisement list either local or from the central computing device and can use the advertisement list to create a second manifest file. The second manifest file can comprise instructions for acquiring the requested content at the second bitrate and the advertisements in the advertisement list at the second bitrate.

[0003] Additional advantages will be set forth in part in the description which follows or may be learned by practice. The advantages will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments and together with the description, serve to explain the principles of the methods and systems:

Figure 1 is a block diagram of an exemplary system and network;
 Figures 2A and 2B are block representations of exemplary sequential data fragments;
 Figure 3 is an exemplary display;
 Figures 4A and 4B are block diagrams of an exemplary system;
 Figure 5 is a flow chart of an exemplary method;
 Figure 6 is a flow chart of an exemplary method;
 Figure 7 is a flow chart of an exemplary method; and
 Figure 8 is a block diagram of an exemplary computing device.

DETAILED DESCRIPTION

[0005] Before the present methods and systems are disclosed and described, it is to be understood that the methods and systems are not limited to specific methods, specific components, or to particular implementations. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting.

[0006] As used in the specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another embodiment. It will be further understood that the endpoints of each of the ranges are significant both in relation to the other endpoint, and independently of the other endpoint.

[0007] "Optional" or "optionally" means that the subsequently described event or circumstance may or may not occur, and that the description includes instances where said event or circumstance occurs and instances where it does not.

[0008] Throughout the description and claims of this specification, the word "comprise" and variations of the word, such as "comprising" and "comprises," means "including but not limited to," and is not intended to exclude, for example, other components, integers or steps. "Exemplary" means "an example of" and is not intended to convey an indication of a preferred or ideal embodiment. "Such as" is not used in a restrictive sense, but for explanatory purposes.

[0009] Disclosed are components that can be used to perform the disclosed methods and systems. These and other components are disclosed herein, and it is understood that when combinations, subsets, interactions, groups, etc. of these components are disclosed that while specific reference of each various individual and collective combinations and permutation of these may not be explicitly disclosed, each is specifically contemplated and described herein, for all methods and systems. This applies to all aspects of this application including, but not limited to, steps in disclosed methods. Thus, if there are a variety of additional steps that can be performed it is understood that each of these additional steps can be performed with any specific embodiment or combination of embodiments of the disclosed methods.

[0010] The present methods and systems may be understood more readily by reference to the following detailed description of preferred embodiments and the examples included therein and to the Figures and their previous and following description.

[0011] As will be appreciated by one skilled in the art, the methods and systems may take the form of an entirely hardware embodiment, an entirely software embodiment, or an embodiment combining software and hardware aspects. Furthermore, the methods and systems may take the form of a computer program product on a computer-readable storage medium having computer-readable program instructions (e.g., computer software) embodied in the storage medium. More particularly, the present methods and systems may take the form of web-implemented computer software. Any suitable computer-readable storage medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

[0012] Embodiments of the methods and systems are described below with reference to block diagrams and flowchart illustrations of methods, systems, apparatuses and computer program products. It will be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, respectively, can be implemented by computer program instructions. These computer program instructions may be loaded onto a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create a means for implementing the functions specified in the flowchart block or blocks.

[0013] These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including computer-readable instructions for implementing the function specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer

or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer-implemented process such that the instructions that execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block or blocks.

[0014] Accordingly, blocks of the block diagrams and flowchart illustrations support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, can be implemented by special purpose hardware-based computer systems that perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

[0015] In one aspect of the disclosure, a system can be configured to ensure advertising continuity to a user device. Those skilled in the art will appreciate that the present methods may be used in various types of networks and systems that employ both digital and analog equipment. One skilled in the art will appreciate that provided herein is a functional description and that the respective functions can be performed by software, hardware, or a combination of software and hardware. The present disclosure is directed to systems and methods for providing content comprising advertising to a user device such as a computer, a tablet, a mobile device, a communications terminal, or the like. In an aspect, the user device can comprise an identifier which can be globally unique, such as a media access control (MAC) address. In another aspect, the identifier can comprise a token. The user device can request content. For example, the content request can comprise a request for a manifest file. A manifest file can be a sequential list of video fragments to play to render content and/or advertisements. The manifest file can comprise references to content video fragments and/or references to advertising video fragments. The content request can be for a manifest file for content and/or advertisements at a first bitrate. In an aspect, the content request can comprise the identifier. The identifier can be used to identify the origin of the content request, as the content request is forwarded amongst the devices in the network. In an aspect, a computing device, such as a content server, can receive the content request.

[0016] The computing device can forward the content request to an advertisement server. The advertisement server can return an advertisement list to the computing device. The advertisement list can comprise a list of specific advertisements in a specific order. In an aspect, the computing device can forward the content request and the advertisement list to a manifest server. In an aspect, the manifest server can be configured to create a manifest file in response to the content request. In an aspect,

the manifest server can be configured to create a content state that can be used to track details/parameters of the content associated with the manifest file such as title, bitrate, etc. For example, the content state can track that a program is being streamed to a device at 480p24. The content state can be any data structure suitable for organizing data, such as a list, database table, etc. The content state represents the state of the content at the user device for which the manifest file was created. In an aspect, the content state can be registered with a central computing device. In an aspect, the content state can be transmitted to a plurality of manifest servers. In an aspect, the content state can be maintained at the central computing device. In a further aspect, the plurality of manifest servers can check the content state at the central computing device in response to receiving a request for a manifest file. In an aspect, the central computing device can be configured to link the identifier of the user device with the advertisement list and the content state. In an aspect, the user device can receive the manifest file. In an aspect, the user device can use the manifest file to retrieve and render the content and advertisements. In an aspect, the user device can request video (content and/or advertisement) fragments from the corresponding locations in the manifest file. In an aspect, the requested content and advertisements can be streamed to the user device. In an aspect, the user device can render the content with advertisements interspersed therein. In an aspect, the systems and methods described herein can ensure that a stream change during playing of an advertisement, such as that caused by an adaptive bitrate quality change, results in continued playing of the same advertisement that the customer was viewing. An adaptive bitrate quality change can comprise, for example, a request for a lower quality bitrate in response to a determination that available bandwidth is decreasing. In another example, an adaptive bitrate quality change can comprise a request for a higher quality bitrate in response to a determination that available bandwidth is increasing. In an aspect, the user device can be playing the content at the first bitrate and be in the middle of one of the advertisements when the user device needs to change bitrates. The user device might need to change bitrates because of a change in quality, for example. The user device might require a better quality or a worse quality. For example, network latency can cause a user device to need a lower quality video (e.g., video at a lower bitrate).

[0017] The user device can make another content request for another manifest file for the content at a second bitrate. In an aspect, even though the video fragments referred to in the new manifest file are at the second bitrate, the advertising video segments can be the same content as the advertising video segments in the previous manifest file at the first bitrate. In a further aspect, the advertising video segments can be at the first bitrate, the second bitrate, or another bitrate.

[0018] FIG. 1 illustrates various aspects of an exem-

plary environment in which the present methods and systems can operate. In an aspect, the disclosed systems can comprise a user device **102** in communication with a computing device **104** such as a content server, for example. The user device **102** and the computing device **104** can be in communication via a private and/or public network **105** such as a proprietary line from a service provider and/or the Internet. Other forms of communications can be used such as wired and wireless telecommunication channels, for example.

[0019] In an aspect, the user device **102** can be an electronic device such as a computer, a smartphone, a laptop, a tablet, a set top box, a display device, or other device capable of communicating with the computing device **104**. In an aspect, the user device **102** can be associated with a user identifier or device identifier **108**. As an example, the device identifier **108** can be any identifier, token, character, string, or the like, for differentiating one user or user device (e.g., user device **102**) from another user or user device. In a further aspect, the device identifier **108** can identify a user or user device as belonging to a particular class of users or user devices. As a further example, the device identifier **108** can comprise information relating to the user device such as a manufacturer, a model or type of device, a service provider associated with the user device **102**, a state of the user device **102**, a locator, and/or a label or classifier. Other information can be represented by the device identifier **108**.

[0020] In an aspect, the device identifier **108** can comprise an address element **110** and a service element **112**. In an aspect, the address element **110** can comprise or provide an internet protocol address, a network address, a media access control (MAC) address, an Internet address, or the like. As an example, the address element **110** can be relied upon to establish a communication session between the user device **102** and the computing device **104** or other devices and/or networks. As a further example, the address element **110** can be used as an identifier or locator of the user device **102**. In an aspect, the address element **110** can be persistent for a particular network.

[0021] In an aspect, the service element **112** can comprise an identification of a service provider associated with the user device **102** and/or with the class of user device **102**. The class of the user device **102** can be related to a type of device, capability of device, type of service being provided, and/or a level of service (e.g., business class, service tier, service package, etc.). As an example, the service element **112** can comprise information relating to or provided by a communication service provider (e.g., Internet service provider) that is providing or enabling data flow such as communication services to the user device **102**. As a further example, the service element **112** can comprise information relating to a preferred service provider for one or more particular services relating to the user device **102**. In an aspect, the address element **110** can be used to identify or

retrieve data from the service element **112**, or vice versa. As a further example, one or more of the address element **110** and the service element **112** can be stored remotely from the user device **102** and retrieved by one or more devices such as the user device **102** and the computing device **104**. Other information can be represented by the service element **112**.

[0022] In an aspect, the user device **102** can transmit a request for content. In an aspect, the request for content can be transmitted to a computing device **104**, such as a content server. In a further aspect, the request for content can be forwarded from the computing device **104** to a manifest server **116**. In an aspect, the request for content can be transmitted directly to a manifest server **116** from the user device **102**.

[0023] In an aspect, the manifest server **116** can create a manifest file in response to the request for content from the user device **102**. The manifest file can comprise references to video fragments. In an aspect, video fragments can share a characteristic, such as a bitrate, a resolution, etc. In an aspect, the video fragments can be homogeneous or heterogeneous in size, relative to each other. In an aspect, the video fragments can relate to the requested content. In an aspect, the video fragments can relate to advertisements. In an aspect, the references can be uniform resource locators (URLs).

[0024] In an aspect, an advertisement server **106** can be queried. In an aspect, the computing device **104** can query the advertisement server **106**. In an aspect, the manifest server **116** can query the advertisement server **106**.

[0025] In an aspect, the advertisement server **106** can create an advertisement list **118** in response to the query. The advertisement list **118** can be transmitted to the manifest server **116**. The advertisement list **118** can be transmitted to the computing device **104**. In an aspect, a manifest server **116** can use the advertisement list **118** to include references to video fragments of the advertisements in the advertisement list **118** in a manifest file. The manifest server **116** can create a content state **120** associated with the user device **102**. In an aspect, the computing device **104** can create the content state **120** associated with the user device **102**. The content state **120** can comprise identification of the content represented in the manifest file. In an aspect, the content state **120** can comprise various parameters (e.g., attributes, properties, preferences, options, etc.) of the content represented in the manifest file. The parameters included in the content state **120** can comprise a bitrate of the content. In an aspect, in response to the inclusion of the advertisement list **118** in the manifest file, the computing device **104** can relate the device identifier **108**, the advertisement list **118**, and the state **120** in a database **114**.

[0026] In an aspect, the computing device **104** can be a server for communicating with the user device **102**. As an example, the computing device **104** can be configured as (or disposed at) a central location (e.g., a headend, or processing facility), which can receive content (e.g.,

data, input programming) from multiple sources. The computing device **104** can combine the content from the multiple sources and can distribute the content to user (e.g., subscriber) locations (e.g., the user device **102**) via a distribution system.

[0027] The manifest server **116** can transmit and/or cause the manifest file to be transmitted (e.g., delivered, provided, etc.) to the user device **102**. In another aspect, the manifest server **116** can transmit the manifest file to the computing device **104** and the computing device **104** can transmit the manifest file to the user device **102**. The user device **102** can request the video fragments at the locations included in the manifest file to create (e.g., assemble, build, retrieve, etc.) video.

[0028] In an aspect, the computing device **104** can manage advertising to be included with in content transmitted to the user device **102**. In an aspect, the computing device **104** can comprise a database **114** for linking the device identifier **108** with the advertisement list **118** used to create the manifest file used by the user device **102** and/or the content state **120**. As an example, when the manifest server **116** creates a manifest file for the user device **102**, the manifest server **116** can transmit a signal to the computing device **104**, wherein the signal comprises the device identifier **108** of the user device **102**. In response to the signal, the computing device **104** can query the database **114** for device identifier **108**. If a content state **120** and advertisement list **118** exists for the device identifier **108**, then the content state **120** can be checked to see if the advertisement list **118** should be used for the manifest file being created by the manifest server **116**. For example, if the content state **120** indicates that the content currently being requested by the user device **102** is not the same as the content currently being presented by the user device **102**, then there is no need to use the same advertisement list **118**. In an aspect, if the content represented in the content state **120** is the same as the content in the currently created manifest file, and the parameters are the same, then the same manifest file can be returned to the user device **102**. The advertisement list **118** can be used in creating a new manifest file if the content represented in the content state **120** is the same as the content in the currently created manifest file, but the parameters are different. For example, if the user device **102** requested the same content, but at a different bitrate, then the same advertisement list **118** should be used to create the manifest file. If it is determined that the same advertisement list **118** should be used, then the manifest server **116** can use the same advertisement list **118** to create the manifest file. If it is determined that the same advertisement list **118** should not be used, then the manifest server **116** can receive a new advertisement list **118** from the advertisement server **106**. In an aspect, a state can comprise the advertisement list **116** and content state **120** and be associated with a device identifier **106**.

[0029] Upon completion of creation of the new manifest file, the manifest server **116** can transmit and/or cause

the newly created manifest file to be transmitted (e.g., delivered, provided, etc.) to the user device **102**. In another aspect, the manifest server **116** can transmit the new manifest file to the computing device **104** and the computing device **104** can transmit the new manifest file to the user device **102**. The user device **102** can request the video fragments at the locations included in the new manifest file to create (e.g., assemble, build, retrieve, etc.) video. In an aspect, video fragments referred to in the new manifest file can be for the same advertisements as in the previous manifest file, only with a different parameters or attributes (e.g., a different bitrate, a different codec, a different size, combinations thereof, and the like). For example, video fragments referred to in the new manifest file can be for the same advertisements as in the previous manifest file, only at the second bitrate.

[0030] FIG. 2A illustrates a block representation of an exemplary set of sequential data fragments **200A**. In an aspect, the set of sequential data fragments **200A** can be assembled using a manifest file comprising references to the set of sequential data fragments **200A**, which can be generated by the manifest server **116**, for example. In an aspect, the references can be uniform resource locators (URLs). The set of sequential data fragments **200A** can comprise data fragments **202A**, **206A**, and **208A**. In an aspect, the data fragments **202A** can represent requested content (e.g., video content). The data fragments **206A** can represent a first advertisement (e.g., a video advertisement) and the data fragments **208A** can represent a second advertisement (e.g., a video advertisement). In an aspect, each data fragment can comprise video and first parameters (e.g., details) related to the video. The first parameters can be content-related parameters. In a further aspect, the first parameters can comprise a first bitrate of the video. In another aspect, the first parameters can comprise a first codec used for encoding and/or used for decoding the video. In yet another aspect, the first parameters can comprise a first format, such as a first size of a display for which the video is formatted.

[0031] Turning now to FIG. 2B, the user device or client may request another version of the content, and also another manifest file. This can occur, for example, if the network connection used by the user device changes, and the user device may seek the content in a lower or higher bitrate to accommodate changing network conditions. If the user device **102** requests the same content with second parameters (for example, the same content, but at a second bitrate), then a new set of sequential data fragments **200B** can be received from the source comprising data fragments **202B** which comprise the content with the second parameters. The second parameters can be content-related parameters. In an aspect, the new set of sequential data fragments **200B** can be assembled using a manifest file from the manifest server **116**. The new set of sequential data fragments **200B** can comprise data fragments **206B** representing the first advertisement and/or data fragments **208B** representing the sec-

ond advertisement. To minimize disruption to a viewing experience, the systems and methods described herein can ensure that an advertisement, such as the first advertisement, that is displayed during the request for another version of the content, is displayed after the request for another version of the content is fulfilled. In an aspect, it can be determined that a version of the first advertisement having the second parameters is available and can be included in the data fragments **206B** in order to match the second parameters of the requested content. For example, the first advertisement is also available at a second bitrate. However, in some instances, it might be determined that there is no version of the first advertisement available having the second parameters (e.g., the first advertisement may not be available at the second bitrate). In such a scenario, the first advertisement included in the data fragments **206B** can be a version of the first advertisement at the same (e.g., original, first) parameters as in the set of sequential data fragments **200A**. For example, the data fragments **206B** representing the first advertisement can be at the first bitrate. Alternatively, if it is determined that there is no version of the first advertisement available with the second parameters, then a version of the first advertisement included in the data fragments **206B** can comprise third parameters (e.g., not the same parameters as originally delivered version of content nor the same parameters as the newly requested version of content). For example, the first advertisement can be at a third bitrate. The third parameters can be content-related parameters. The third parameters can be a closest available version of the first advertisement to the second parameters. For example, the third bitrate can be a bitrate closest to the second bitrate at which the first advertisement is available. The third parameter can be closer to the second parameter than the first parameters. For example, the third bitrate can be closer to the second bitrate than the first bitrate. Although the examples focused on bitrates, other parameters (e.g., codec used for encoding, format, size, etc.) can be used.

[0032] FIG. 3 illustrates an exemplary display in accordance with the systems and methods described herein. In an aspect, display **302** shows content **304** at a first bitrate. In another aspect, the display **302** can represent the content **304** encoded by a first codec. In yet another aspect, the display **302** can comprise a first size and can represent the content **304** formatted for the first size. In an aspect, display **306** can represent the same content **304** but with a second parameter. In a further aspect, the display **306** can show content **304** at a second bitrate. In an aspect, the content **304** at the first bitrate can be at a lower bitrate than the content **304** at the second bitrate. In an aspect, the content **304** at the first bitrate can be at a higher bitrate than the content **304** at the second bitrate. In another aspect, the display **302** can represent the content **304** encoded by a second codec. In yet another aspect, the display **302** can comprise a second size and can represent the content **304** formatted for the second size. In an aspect, the first size can be greater than

the second size. In an aspect, the first size can be less than the second size. In an aspect, the display **302** can represent the content **304** displayed when a buffer comprises less than and/or equal to a predetermined threshold number of video frames or other units of the content **304**. In an aspect, the display **306** can represent the content **304** displayed when a buffer comprises more than and/or equal to a predetermined threshold number of video frames or other units of the content **304**.

[0033] **FIGs. 4A** and **4B** illustrate block diagrams representing an exemplary system and architecture. The methods and systems described herein can be used in conjunction with content comprising any number of attribute or parameter options. For example, **FIGs. 4A** and **4B** illustrate content comprising multiple bitrate options. Turning first to **FIG. 4A**, a user device **102** (e.g., a video player or client) can request content at a first bitrate **404** from a content provider or content delivery network **410**. In an aspect, the content can also be available from the content provider **410** at a second bitrate **406** and a third bitrate **408**. In response to the request, the content provider **410** can query an advertisement server **106**. The advertisement server **106** can determine that Advertisements A1, A2, and A3 should be inserted into the requested content and returned to the user device **102**. A first manifest server (M1) **116** of a plurality of manifest servers (M1 ... Mn) **116** associated with the content provider or deliver network **410** can create and deliver a first manifest file to the user device **102**. The first manifest file may comprise references to the requested content at the requested bitrate **404** and references to Advertisements A1, A2, and A3 at the requested bitrate **404**. In an aspect, the first manifest server **116** can create state information **402** associated with the first manifest file, where the state information **402** can comprise all of the parameters and attributes of the content for which the manifest file was created. The manifest server **116** may transmit the state information **402** to one or more of the rest of the plurality of manifest servers **116**. In another aspect, the first manifest server **116** can create the state information **402** and transmit the state information **402** to a central location accessible to the plurality of manifest servers **116**. In an aspect, the state information **402** can comprise the advertisement list and content state **120** and be associated with a device identifier **106**. The state information **402** can be associated with a particular manifest file that was generated and/or sent to a user device. The state information **402** can be stored as a separate file from the particular manifest file, linked by an identifier(s) or the state information **402** can be stored as part of the particular manifest file. The result is that the particular manifest file can be used to readily provide a location for a version (e.g., content/advertisement at a specific (or proximate) requested parameters) of requested content/advertisements that best fits a request by referencing the state information **402**.

[0034] Turning now to **FIG. 4B**, the user device **102** can request the content at the second bitrate **406** from

the content provider **410**. The request can be sent or received after a portion of the content has already been transmitted to the user device **102**, or consumed by a user of the device **102**. In an aspect, any of the plurality of manifest servers **116** associated with the content provider or delivery service **410** can receive the request and check the state information **402**. In an aspect, the manifest server **116** in receipt of the request or a centrally located computing device **104** can recognize that the requested content at the second bitrate **406** is the same content currently being consumed by, or delivered to the user device **102** at the first bitrate **404** (e.g., via a content identifier). For example, the manifest server **116** in receipt of the request (or a centrally located computing device **104**) can recognize that the content currently being consumed by, or delivered to, the user device **102** comprises the same content identifier as the content currently being requested and that the content is currently being consumed or delivered with parameters different from the parameters currently being requested. In another example, the manifest server **116** in receipt of the request or a centrally located computing device **104** can access state information **402** to match the content identifier of the content currently being consumed by, or delivered to the user device **102** with the content identifier of the content currently being requested and access the state information **402** to determine that the content is currently being consumer or delivered with parameters different from the parameters currently being requested. The manifest server **116** can create a second manifest file that comprises references to the content at the second bitrate **406**. The advertisement list can be accessed using the state information **402**. Advertisements A1, A2, and A3 can be determined to be in the first manifest file. The second manifest file can also comprise references to the Advertisements A1, A2, and A3 at the second bitrate **406**, since such advertisements were identified to be inserted into the content by accessing the state information **402**. In an aspect, if one or more of the Advertisements A1, A2, or A3 are not available at the second bitrate **406**, then a suitable replacement for the unavailable advertisement, such as the advertisement at the closest bitrate to the second bitrate **406**, an advertisement for a same company and/or product as the unavailable advertisement, and the like, can be included. In an aspect, the second manifest file can comprise references to one or more of the Advertisements A1, A2, and A3 at the first bitrate **404**, if the one or more Advertisements are unavailable at the second bitrate **406**. In an aspect, the second manifest file can comprise references to one or more of the Advertisements A1, A2, and A3 at the third bitrate **408**, if the one or more Advertisements is unavailable at the second bitrate **406**. The second manifest file can be delivered to the user device **102**. The state information **402** can be updated to reflect the second manifest file delivered to the user device **102**. For example, the updated state information **402** can comprise the second parameters. The updated state information **402** can be

transmitted to one or more of the plurality of manifest servers 116. In another aspect, the updated state information 402 can be transmitted to a central location accessible to the plurality of manifest servers 116.

[0035] FIG. 5 illustrates an exemplary method 500, which, in one example, may be implemented by one or more manifest servers 116. At step 502, a request of selection for content can be received from a user device. In an aspect, the requested content can be video content. In an aspect, the user device can be a set top box, a computing device, a mobile device, a gateway and the like. The request or selection can comprise one or more first requested parameters or attributes, for example, a first bitrate, a first codec, a first file size or frame rate, combinations thereof, and the like. Optionally, the selection for content can comprise a device identifier associated with the user device. In an aspect, the device identifier can be a media access control (MAC) address. In another further aspect, the identifier can comprise a token. In an aspect, the token can be globally unique.

[0036] At step 504, a first manifest file, comprising for example a reference to content fragments and a first plurality of advertising fragments at the first parameters, can be generated. A first manifest file comprising a reference to fragments of the content at the first bitrate and a reference to a first plurality of advertising fragments at the first bitrate, encoded with the first codec, and/or formatted for the first size, can be generated. In an aspect, the references can be to an order of fragments or locations where the fragments can be retrieved. In a further aspect, the references can be uniform resource identifiers (URIs). In a further aspect, the references can be uniform resource locators (URLs).

[0037] At step 506, state information associated with the first manifest file and other information, such as the device identifier and parameters, can be created and/or stored. Optionally, the state information can comprise an advertisement list related to the first plurality of advertising fragments (e.g., the video fragments that make up each of the advertisements in the advertisement list). Optionally, the state information can represent a content state. In an aspect, the content state can comprise identification of the selected content. In an aspect, the content state can comprise the first parameters, for example, the first bitrate, the first codec, the first size, combinations thereof, and the like.

[0038] At step 508, a request or selection comprising second parameters can be received from the user device. The second parameters can be, for example, a second bitrate, a second codec, a second size or rate, combinations thereof, and the like. In an aspect, the request or selection is for the same content, but with one or more different, or second parameters. In an aspect, the selection for the second parameters can be received while the user device is rendering or displaying an advertisement or other portion of content associated with the first manifest file. In an aspect, the selection can comprise the device identifier from the user device.

[0039] At step 510, the state information associated with the first manifest file and/or device identifier can be accessed. In an aspect, the device identifier in the selection can be used to access the state information. In an aspect, the state information can be accessed from a local or remote memory. In an aspect, the state information can be retrieved from a remote computing device.

[0040] At step 512, a second manifest file can be generated. In an aspect, the second manifest file can comprise a reference to fragments of the content with the second parameters. In an aspect, the second manifest file can comprise a reference to fragments of the content at the second bitrate, encoded with the second codec, formatted for the second size, combinations thereof, and the like. In an aspect, the second manifest file can comprise a reference to a second plurality of advertising fragments. In an aspect, the second plurality of advertising fragments can be related to the first plurality of advertising fragments in the state information. In an aspect, the second plurality of advertising fragments can refer or point to the same advertisements as the first plurality of advertising fragments. To minimize disruption to a viewing experience, the systems and methods described herein can ensure that an advertisement, such as the first plurality of advertising fragments, that is displayed during the request or selection for second parameters, is displayed after the request or selection is fulfilled. Therefore, the second plurality of advertising fragments can comprise the same advertisement as the first plurality of advertising fragments, even if the advertisement is not available with the second parameters. In an aspect, the second plurality of advertising fragments can comprise third parameters. In an aspect, the second plurality of advertising fragments can comprise a third bitrate, can be encoded with a third codec, can be formatted for a third size, combinations thereof, and the like. In an aspect, the third parameters can be the same as the first parameters. In an aspect, the third bitrate can be the same as the first bitrate. In an aspect, the third codec can be the same as the first codec. In an aspect, the third size can be the same as the first size. In an aspect, the third parameters can be the same as the second parameters. In an aspect, the third bitrate can be the same as the second bitrate. In an aspect, the third codec can be the same as the second codec. In an aspect, the third size can be the same as the second size. In an aspect, the third parameters can be different from the first parameters and the second parameters. In an aspect, the third bitrate can be different from the first bitrate and the second bitrate. In an aspect, the third codec can be different from the first codec and the second codec. In an aspect, the third size can be different from the first size and the second size.

[0041] In an aspect, the second plurality of advertising fragments can be related to the first plurality of advertising fragments. Optionally, the second plurality of advertising fragments can comprise a reference to advertising fragments that represent different advertisements from advertisements represented by the first plurality of adver-

tising fragments. For example, this could be due to a different advertisement being chosen for the user when the second request is received (e.g., the different advertisement may be more relevant at a second, later point in time). Optionally, one or more different advertisements can be added to the advertisement list in the state information. In an aspect, the one or more different advertisements can replace one or more advertisements previously in the advertisement list. In a further aspect, the one or more different advertisements can be related to the respective one or more advertisements being replaced. In an even further aspect, one of the one or more different advertisements can be for the same product as the advertisement being replaced. In another further aspect, one of the one or more different advertisements can be for the same company as the advertisement being replaced. In an aspect, an advertisement currently displayed is the same advertisement displayed after the change in parameters. In an aspect, an advertisement currently displayed is the same advertisement displayed after the change in bitrate. In an aspect, an advertisement currently displayed is the same advertisement displayed after the change in codec. In an aspect, an advertisement currently displayed is the same advertisement displayed after the change in size.

[0042] FIG. 6 illustrates an exemplary method 600, executing on a user device 102. At step 602, a selection for content can be transmitted. The selection for content can comprise a selection for a first parameter. The first parameter can be, for example, a first bitrate, a first codec, a first size, combinations thereof, and the like. The selection for content can comprise an identifier. In an aspect, the identifier can be associated with the user device. In an aspect, the identifier can be a media access control (MAC) address. In a further aspect, the identifier can comprise a token. In an aspect, the token can be globally unique. In an aspect, the user device can be a set top box, a computing device, a mobile device, and the like. In an aspect, the content can comprise video.

[0043] At step 604, a first data stream can be received. The first data stream can comprise the selected content comprising first parameter. For example, the first parameter can comprise a first bitrate, a first codec, a first size, combinations thereof, and the like. The first data stream can comprise a plurality of advertisements. The plurality of advertisements can comprise the first parameter. For example, the plurality of advertisements can be at the first bitrate, encoded with the first codec, formatted for the first size, combinations thereof, and the like. In an aspect, the first data stream can comprise an Internet Protocol (IP) stream.

[0044] At step 606, the first data stream can be presented on a display device. In an aspect, the display device can be a television, a monitor, a mobile device, and the like.

[0045] At step 608, a selection for a second parameter can be transmitted while one of the first plurality of advertisements is displayed on the display device. The sec-

ond parameter can be, for example, a second bitrate, a second codec, a second size, combinations thereof, and the like. At step 610, a second data stream comprising the selected content with the second parameter can be received. For example, the second data stream can comprise the selected content at the second bitrate, the selected content encoded with the second codec, the selected content formatted for the second size, combinations thereof, and the like. In an aspect, the second data stream can comprise a second plurality of advertisements. The second data stream can comprise an Internet Protocol (IP) stream.

[0046] At step 612, a transition from displaying the first data stream to displaying the second data stream can be made. Optionally, the transition can happen while the one of the first plurality of advertisements is displayed on the display device. In an aspect, the second data stream can be presented on the display device. The transition from displaying the first data stream to displaying the second data stream can maintain continuity. In an aspect, maintaining continuity can comprise a seamless transition that is not perceptible to a viewer. In an aspect, maintaining continuity can comprise beginning display of the second data stream at or just after a time point where display of the first data stream ended, despite a possible perceivable difference in display quality before and after the transition. In an aspect, maintaining continuity can comprise displaying the same advertisement before and after the transition. In an aspect, maintaining continuity can comprise displaying an advertisement for the same company and/or product after the transition as was being displayed before the transition. The advertisement can be displayed on the display device. In an aspect, the advertisement can be displayed on the display device with the second parameter. For example, the advertisement can be displayed on the display device at the second bitrate, using the second codec, at the second size, combinations thereof, and the like. In an aspect, the advertisement can be displayed on the display device with the first parameter. For example, the advertisement can be displayed on the display device at the first bitrate, using the first codec, at the first size, combinations thereof, and the like. In an aspect, the advertisement can be displayed on the display device with the third parameter. For example, the advertisement can be displayed on the display device at the third bitrate, using the third codec, at the third size, combinations thereof, and the like.

[0047] FIG. 7 illustrates an exemplary method 700, executing on one or more manifest servers 116. At step 702, an identifier of a user device, an identifier of content with a first parameter, and an identifier of a plurality of advertisements with the first parameter can be received at a first manifest server. The first parameter can be, for example, a first bitrate, a first codec, a first size, combinations thereof, and the like. In an aspect, the received identifiers can be received in response to a request. In an aspect, a request for a first video stream can be received at a first manifest server of a plurality of manifest

servers from a user device. In an aspect, the request for the first video stream can comprise a request for content with the first parameter. In an aspect, the first video stream can comprise Internet Protocol (IP) delivery. In an aspect, the user device can be a set top box, a computing device, a mobile device, and the like.

[0048] At step **704**, a first manifest file can be generated. In an aspect, the first manifest file can be generated in response to the request. In an aspect, the first manifest file can comprise an identifier. In an aspect, the identifier can comprise a device identifier associated with the user device. In an aspect, the identifier can comprise a device identifier associated with the user device originating the request for the first video stream. In a further aspect, the identifier can comprise a media access control (MAC) address associated with the device originating the request for the first video stream. In another further aspect, the identifier can comprise a token. In an aspect, the token can be globally unique. In an aspect, the first manifest file can comprise a reference to the content with the first parameter. For example, the first manifest file can comprise a reference to the content at the first bitrate, the content encoded with the first codec, the content formatted for the first size, combinations thereof, and the like. In an aspect, the first manifest file can comprise a first plurality of references to the plurality of advertisements at the first parameter. For example, the first manifest file can comprise a first plurality of references to the plurality of advertisements at the first bitrate, a first plurality of references to the plurality of advertisements encoded at the first codec, a first plurality of references to the plurality of advertisements formatted for the first size, combinations thereof, and the like.

[0049] At step **706**, the first manifest file can be transmitted to the user device. In an aspect, the user device can use the reference to the content in the first manifest file to request content. In an aspect, the reference to the content can comprise a uniform resource identifier (URI). In a further aspect, the reference to the content can comprise a uniform resource locator (URL). In an aspect, the user device can use the first plurality of references to the plurality of advertisements in the first manifest file to request one of the plurality of advertisements. In an aspect, the first plurality of references to the plurality of advertisements can comprise uniform resource identifiers (URIs). In a further aspect, the first plurality of references to the plurality of advertisements can comprise uniform resource locators (URLs).

[0050] At step **708**, the first manifest file, or a reference to the first manifest file that can be used to identify information in the first manifest file, can be stored such that it is easily identifiable and accessible by a plurality of manifest file generating devices. An identifier of the user device can be associated with the first manifest file. In an aspect, the first manifest file and/or the user device identifier can be transmitted to a second manifest server, of a plurality of manifest servers, that may be centrally located or easily accessible by other manifest file servers.

At step **710**, the identifier of the user device and an identifier of the content with a second parameter can be received at any of the manifest file servers or computing devices. The second parameter can be, for example, a second bitrate, a second codec, a second size, combinations thereof, and the like. A subsequent request for a second video stream of the content with the second parameter can be received from the user device at any of the plurality of manifest servers.

[0051] At step **712**, the content and the plurality of advertisements can be identified based on the first manifest file and/or the identifier of the user device. A determination can be made that the user device is requesting content already playing at the user device. For example, a content identifier of the content already playing at the user device can be matched with a content identifier of the requested content using the first manifest file and/or the identifier of the user device. The first parameter can be identified using the first manifest file and/or the identifier of the user device and can be determined to be different from the second parameter. Therefore, the plurality of advertisements in the first manifest file can be identified. In an aspect, the plurality of advertisements can be identified in response to receiving the identifier of the user device. For example, the identifier of the user device can be received in a request to generate a manifest file. In an aspect, the plurality of advertisements can be identified locally. In an aspect, the plurality of advertisements can be identified by transmitting the identifier of the user device to a central computing device. Identifying the plurality of advertisements can allow the plurality of advertisements to be used in a newly generated manifest file. Therefore, the need to generate a new plurality of advertisement can be alleviated. Additionally, if a new plurality of advertisements is needed, the plurality of advertisements in the first manifest file (e.g., what advertisements has the viewer seen; what advertisements the viewer was scheduled to view, but has not seen yet; what advertisement the viewer was currently watching; etc.) can be considered in creating the new plurality of advertisements. The knowledge of the plurality of advertisements in the first manifest file can help prevent the viewer from being exposed to the same advertisements repeatedly.

[0052] At step **714**, a second manifest file can be generated. In an aspect, the second manifest file can comprise the identifier of the user device. In an aspect, the second manifest file can comprise a reference to the content at the second parameter. In an aspect, the second manifest file can comprise a second plurality of references to the plurality of advertisements. In an aspect, the subsequent request for the second video stream can cause the second manifest file to be created. In an aspect, the second manifest file can synchronize advertising content with the first manifest file. In an aspect, the second video stream can comprise Internet Protocol (IP) delivery. In an aspect, the second manifest file can comprise references to the same advertising content as the

first manifest file. In an aspect, the same advertising content can be at the second parameter. In an aspect, the same advertising content can be at the first parameter. In an aspect, the same advertising content can be at a third parameter.

[0053] At step 716, the second manifest file can be transmitted to the user device. In an aspect, the user device can use the reference to the content in the second manifest file to request content. In an aspect, the reference to the content can comprise a uniform resource identifier (URI). In a further aspect, the reference to the content can comprise a uniform resource locator (URL). In an aspect, the user device can use the first plurality of references to the plurality of advertisements in the second manifest file to request one of the plurality of advertisements. In an aspect, the first plurality of references to the plurality of advertisements can comprise uniform resource identifiers (URIs). In a further aspect, the first plurality of references to the plurality of advertisements can comprise uniform resource locators (URLs).

[0054] In an exemplary aspect, the methods and systems can be implemented on a computer 801 as illustrated in FIG. 8 and described below. By way of example, server 104 of FIG. 1 can be a computer as illustrated in FIG. 8. Similarly, the methods and systems disclosed can utilize one or more computers to perform one or more functions in one or more locations. FIG. 8 is a block diagram illustrating an exemplary operating environment for performing the disclosed methods. This exemplary operating environment is only an example of an operating environment and is not intended to suggest any limitation as to the scope of use or functionality of operating environment architecture. Neither should the operating environment be interpreted as having any dependency or requirement relating to any one or combination of components illustrated in the exemplary operating environment.

[0055] The present methods and systems can be operational with numerous other general purpose or special purpose computing system environments or configurations. Examples of well known computing systems, environments, and/or configurations that can be suitable for use with the systems and methods comprise, but are not limited to, personal computers, server computers, laptop devices, and multiprocessor systems. Additional examples comprise set top boxes, programmable consumer electronics, network PCs, minicomputers, mainframe computers, distributed computing environments that comprise any of the above systems or devices, and the like.

[0056] The processing of the disclosed methods and systems can be performed by software components. The disclosed systems and methods can be described in the general context of computer-executable instructions, such as program modules, being executed by one or more computers or other devices. Generally, program modules comprise computer code, routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data

types. The disclosed methods can also be practiced in grid-based and distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules can be located in both local and remote computer storage media including memory storage devices.

[0057] Further, one skilled in the art will appreciate that the systems and methods disclosed herein can be implemented via a general-purpose computing device in the form of a computer 801. The components of the computer 801 can comprise, but are not limited to, one or more processors 803, a system memory 812, and a system bus 813 that couples various system components including the one or more processors 803 to the system memory 812. The system can utilize parallel computing.

[0058] The system bus 813 represents one or more of several possible types of bus structures, including a memory bus or memory controller, a peripheral bus, an accelerated graphics port, or local bus using any of a variety of bus architectures. By way of example, such architectures can comprise an Industry Standard Architecture (ISA) bus, a Micro Channel Architecture (MCA) bus, an Enhanced ISA (EISA) bus, a Video Electronics Standards Association (VESA) local bus, an Accelerated Graphics Port (AGP) bus, and a Peripheral Component Interconnects (PCI), a PCI-Express bus, a Personal Computer Memory Card Industry Association (PCMCIA), Universal Serial Bus (USB) and the like. The bus 813, and all buses specified in this description can also be implemented over a wired or wireless network connection and each of the subsystems, including the one or more processors 803, a mass storage device 804, an operating system 805, advertising continuity software 806, advertising continuity data 807, a network adapter 808, the system memory 812, an Input/Output Interface 810, a display adapter 809, a display device 811, and a human machine interface 802, can be contained within one or more remote computing devices 814a,b,c at physically separate locations, connected through buses of this form, in effect implementing a fully distributed system.

[0059] The computer 801 typically comprises a variety of computer readable media. Exemplary readable media can be any available media that is accessible by the computer 801 and comprises, for example and not meant to be limiting, both volatile and non-volatile media, removable and non-removable media. The system memory 812 comprises computer readable media in the form of volatile memory, such as random access memory (RAM), and/or non-volatile memory, such as read only memory (ROM). The system memory 812 typically contains data such as the advertising continuity data 807 and/or program modules such as the operating system 805 and the advertising continuity software 806 that are immediately accessible to and/or are presently operated on by the one or more processors 803.

[0060] In another aspect, the computer 801 can also comprise other removable/non-removable, volatile/non-

volatile computer storage media. By way of example, **FIG. 8** illustrates the mass storage device **804** which can provide non-volatile storage of computer code, computer readable instructions, data structures, program modules, and other data for the computer **801**. For example and not meant to be limiting, the mass storage device **804** can be a hard disk, a removable magnetic disk, a removable optical disk, magnetic cassettes or other magnetic storage devices, flash memory cards, CD-ROM, digital versatile disks (DVD) or other optical storage, random access memories (RAM), read only memories (ROM), electrically erasable programmable read-only memory (EEPROM), and the like.

[0061] Optionally, any number of program modules can be stored on the mass storage device **804**, including by way of example, the operating system **805** and the advertising continuity software **806**. Each of the operating system **805** and the advertising continuity software **806** (or some combination thereof) can comprise elements of the programming and the advertising continuity software **806**. The advertising continuity data **807** can also be stored on the mass storage device **804**. The advertising continuity data **807** can be stored in any of one or more databases known in the art. Examples of such databases comprise, DB2®, Microsoft® Access, Microsoft® SQL Server, Oracle®, MySQL, PostgreSQL, and the like. The databases can be centralized or distributed across multiple systems.

[0062] In another aspect, the user can enter commands and information into the computer **801** via an input device (not shown). Examples of such input devices comprise, but are not limited to, a keyboard, pointing device (e.g., a "mouse"), a microphone, a joystick, a scanner, tactile input devices such as gloves, and other body coverings, and the like. These and other input devices can be connected to the one or more processors **803** via the human machine interface **802** that is coupled to the system bus **813**, but can be connected by other interface and bus structures, such as a parallel port, game port, an IEEE 1394 Port (also known as a Firewire port), a serial port, or a universal serial bus (USB).

[0063] In yet another aspect, the display device **811** can also be connected to the system bus **813** via an interface, such as the display adapter **809**. It is contemplated that the computer **801** can have more than one display adapter **809** and the computer **801** can have more than one display device **811**. For example, a display device can be a monitor, an LCD (Liquid Crystal Display), or a projector. In addition to the display device **811**, other output peripheral devices can comprise components such as speakers (not shown) and a printer (not shown) which can be connected to the computer **801** via the Input/Output Interface **810**. Any step and/or result of the methods can be output in any form to an output device. Such output can be any form of visual representation, including, but not limited to, textual, graphical, animation, audio, tactile, and the like. The display **811** and computer **801** can be part of one device, or separate devices.

[0064] The computer **801** can operate in a networked environment using logical connections to one or more remote computing devices **814a,b,c**. By way of example, a remote computing device can be a personal computer, portable computer, smartphone, a server, a router, a network computer, a peer device or other common network node, and so on. Logical connections between the computer **801** and a remote computing device **814a,b,c** can be made via a network **815**, such as a local area network (LAN) and/or a general wide area network (WAN). Such network connections can be through the network adapter **808**. The network adapter **808** can be implemented in both wired and wireless environments. Such networking environments are conventional and commonplace in dwellings, offices, enterprise-wide computer networks, intranets, and the Internet.

[0065] For purposes of illustration, application programs and other executable program components such as the operating system **805** are illustrated herein as discrete blocks, although it is recognized that such programs and components reside at various times in different storage components of the computing device **801**, and are executed by the one or more processors **803** of the computer. An implementation of the advertising continuity software **806** can be stored on or transmitted across some form of computer readable media. Any of the disclosed methods can be performed by computer readable instructions embodied on computer readable media. Computer readable media can be any available media that can be accessed by a computer. By way of example and not meant to be limiting, computer readable media can comprise "computer storage media" and "communications media." "Computer storage media" comprise volatile and non-volatile, removable and non-removable media implemented in any methods or technology for storage of information such as computer readable instructions, data structures, program modules, or other data. Exemplary computer storage media comprises, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by a computer.

[0066] The methods and systems can employ Artificial Intelligence techniques such as machine learning and iterative learning. Examples of such techniques include, but are not limited to, expert systems, case based reasoning, Bayesian networks, behavior based AI, neural networks, fuzzy systems, evolutionary computation (e.g. genetic algorithms), swarm intelligence (e.g. ant algorithms), and hybrid intelligent systems (e.g. Expert inference rules generated through a neural network or production rules from statistical learning).

[0067] While the methods and systems have been described in connection with preferred embodiments and specific examples, it is not intended that the scope be

limited to the particular embodiments set forth, as the embodiments herein are intended in all respects to be illustrative rather than restrictive.

[0068] Unless otherwise expressly stated, it is in no way intended that any method set forth herein be construed as requiring that its steps be performed in a specific order. Accordingly, where a method claim does not actually recite an order to be followed by its steps or it is not otherwise specifically stated in the claims or descriptions that the steps are to be limited to a specific order, it is no way intended that an order be inferred, in any respect. This holds for any possible non-express basis for interpretation, including: matters of logic with respect to arrangement of steps or operational flow; plain meaning derived from grammatical organization or punctuation; the number or type of embodiments described in the specification.

[0069] Throughout this application, various publications are referenced. The disclosures of these publications in their entireties are hereby incorporated by reference into this application in order to more fully describe the state of the art to which the methods and systems pertain.

[0070] It will be apparent to those skilled in the art that various modifications and variations can be made without departing from the scope or spirit. Other embodiments will be apparent to those skilled in the art from consideration of the specification and practice disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit being indicated by the following claims.

[0071] Hereinafter, various characteristics of various embodiments of the invention will be highlighted in a set of numbered clauses or paragraphs. These characteristics are not to be interpreted as being limiting on the invention or inventive concept, but are provided merely as a highlighting of some characteristics of the invention as described in the description, without suggesting a particular order of importance or relevancy of such characteristics. The invention is only limited by the appended claims presented in the correspondingly named section. The number clauses include:

Clause 1 A method comprising:

receiving a first request for content from a user device, wherein the first request for content comprises a selection of a first bitrate, and wherein the first request for content;
generating a first manifest file comprising a reference to fragments of the content at the first bitrate and a reference to a first plurality of advertising fragments at the first bit rate;
storing state information associated with the first manifest file;
receiving a second request for the content from the user device, wherein the second request comprises a selection of a second bitrate;

accessing the stored state information associated with the first manifest file; and
generating a second manifest file comprising a reference to fragments of the content at the second bitrate and a reference to a second plurality of advertising fragments at a third bitrate, wherein at least one of the second plurality of advertising fragments is related to at least one of the first plurality of advertising fragments.

Clause 2 The method of clause 1, wherein the second bitrate is the same as the third bitrate.

Clause 3 The method of clause 2, wherein the first plurality of advertising fragments comprise the same content as the second plurality of advertising fragments.

Clause 4 The method of clause 1, wherein the second bitrate is different from the third bitrate and the first bitrate is different from the third bitrate.

Clause 5 The method of clause 1, wherein the first bitrate is the same as the third bitrate.

Clause 6 The method of clause 1, wherein the accessing the stored state information associated with the first manifest file further comprises accessing a central computing device to determine if the stored state information needs to be updated.

Clause 7 The method of clause 1, wherein the at least one of the first plurality of advertising fragments is an advertising fragment displayed when the selection of the second bitrate is received from the user device.

Clause 8 The method of clause 1, wherein the second manifest file comprises additional advertising fragments and further comprising adding additional advertisements relating to the additional advertising fragments to the advertisement list in the stored state information.

Clause 9 A method comprising:

transmitting a first request for content, wherein the first request for content comprises a selection of a first bitrate, and wherein the first request for content comprises an identifier;
receiving a first data stream comprising the selected content at the first bitrate and a first plurality of advertisements at the first bitrate;
presenting the first data stream on a display device;
transmitting second request for the content while one of the first plurality of advertisements is displayed on the display device, wherein the

second request for content comprises a selection of a second bitrate ;
 receiving a second data stream comprising the requested content at the second bitrate and a second plurality of advertisements; and
 transitioning from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device.

Clause 10 The method of clause 9, wherein the presenting the second data stream on the display device to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device further comprises presenting the one of the first plurality of advertisements at the first bitrate after the transition.

Clause 11 The method of clause 10, wherein the presenting the second data stream on the display device to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device further comprises presenting the one of the first plurality of advertisements at the second bitrate after the transition.

Clause 12 The method of clause 9, wherein the presenting the second data stream on the display device to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device further comprises presenting the one of the first plurality of advertisements at a third bitrate after the transition.

Clause 13 The method of clause 9, wherein the presenting the second data stream on the display device to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device further comprises:

determining a time point of the one of the first plurality of advertisements displayed at the moment of the transition; and
 presenting the one of the first plurality of advertisements in the second plurality of advertisements starting at the time point after the transition.

Clause 14 The method of clause 9, wherein the first data stream comprises an Internet Protocol (IP) stream.

Clause 15 The method of clause 9, wherein the second data stream comprises an Internet Protocol (IP)

stream.

Clause 16 A method comprising:

receiving, at a first manifest server, an identifier of a user device, an identifier of content at a first bitrate, and an identifier of a plurality of advertisements at the first bitrate;
 generating a first manifest file, wherein the first manifest file comprises the identifier of the user device, a reference to the content at the first bitrate, and a first plurality of references to the plurality of advertisements at the first bitrate;
 transmitting the first manifest file to the user device;
 transmitting the identifier of the user device to a second manifest server;
 receiving, at the second manifest server, the identifier of the user device and an identifier of the content at a second bitrate;
 identifying the plurality of advertisements based on the identifier of the user device;
 generating a second manifest file wherein the second manifest file comprises the identifier of the user device, a reference to the content at the second bitrate, and a second plurality of references to the plurality of advertisements; and
 transmitting the second manifest file to the user device.

Clause 17 The method of clause 16, wherein the second plurality of references to the plurality of advertisements comprises references to the plurality of advertisements at the second bitrate.

Clause 18 The method of clause 16, wherein the second plurality of references to the plurality of advertisements comprises references to the plurality of advertisements at the first bitrate.

Clause 19 The method of clause 16, wherein the second plurality of references to the plurality of advertisements comprise references to the plurality of advertisements at a third bitrate.

Clause 20 The method of clause 16, wherein the first video stream comprises an Internet Protocol (IP) stream.

Claims

1. A method comprising:

receiving a first request for content from a user device (102), wherein the first request for content comprises a selection of a first bitrate (404);
 generating a first manifest file comprising a ref-

- erence to fragments (200A) of the content at the first bitrate (404) and a reference to a first plurality of advertising fragments at the first bit rate; storing state information associated with the first manifest file;
 receiving a second request for the content from the user device (102), wherein the second request comprises a selection of a second bitrate; accessing the stored state information associated with the first manifest file; and
 generating a second manifest file comprising a reference to fragments (200A) of the content at the second bitrate (406) and a reference to a second plurality of advertising fragments at a third bitrate (408), wherein at least one of the second plurality of advertising fragments is related to at least one of the first plurality of advertising fragments.
2. An apparatus comprising:
 one or more processors (803); and
 a memory (812) comprising processor executable instructions that, when executed by the one or more processors (803), cause the apparatus to:
 receive a first request for content from a user device (102), wherein the first request for content comprises a selection of a first bitrate (404);
 generate a first manifest file comprising a reference to fragments (200A) of the content at the first bitrate (404) and a reference to a first plurality of advertising fragments at the first bit rate;
 store state information associated with the first manifest file; receive a second request for the content from the user device (102), wherein the second request comprises a selection of a second bitrate (406);
 access the stored state information associated with the first manifest file; and generate a second manifest file comprising a reference to fragments (200A) of the content at the second bitrate and a reference to a second plurality of advertising fragments at a third bitrate (408), wherein at least one of the second plurality of advertising fragments is related to at least one of the first plurality of advertising fragments.
3. The method of claim 1 or the apparatus of claim 2, wherein the second bitrate (406) is the same as the third bitrate (408).
4. Any of the claims 1-3, wherein the first plurality of advertising fragments comprise the same content as the second plurality of advertising fragments.
5. Any of the claims 1-4, wherein the second bitrate (406) is different from the third bitrate (408) and the first bitrate (404) is different from the third bitrate (408).
6. Any of the claims 1-5, wherein the first bitrate (404) is the same as the third bitrate (408).
7. Any of the claims 1-6, wherein the accessing the stored state information associated with the first manifest file further comprises accessing a central computing device (104) to determine if the stored state information needs to be updated.
8. Any of the claims 1-7, wherein the at least one of the first plurality of advertising fragments is an advertising fragment displayed when the selection of the second bitrate (406) is received from the user device (102).
9. Any of the claims 1-8, wherein the second manifest file comprises additional advertising fragments and further comprising adding additional advertisements relating to the additional advertising fragments to the advertisement list in the stored state information.
10. A method comprising:
 transmitting a first request for content, wherein the first request for content comprises a selection of a first bitrate (404), and wherein the first request for content comprises an identifier (108);
 receiving a first data stream comprising the selected content at the first bitrate (404) and a first plurality of advertisements at the first bitrate (404);
 presenting the first data stream on a display device (811);
 transmitting second request for the content while one of the first plurality of advertisements is displayed on the display device (811), wherein the second request for content comprises a selection of a second bitrate (406);
 receiving a second data stream comprising the requested content at the second bitrate (406) and a second plurality of advertisements; and
 transitioning from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device (811).
11. The method of claim 10, wherein the presenting the second data stream on the display device (811) to transition from displaying the first data stream to displaying the second data stream while the one of the

first plurality of advertisements is displayed on the display device (811) further comprises presenting the one of the first plurality of advertisements at the first bitrate (404) after the transition.

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12. The method of claim 10, wherein the presenting the second data stream on the display device (811) to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device (811) further comprises presenting the one of the first plurality of advertisements at the second bitrate (406) after the transition. 10
13. The method of claim 10, wherein the presenting the second data stream on the display device (811) to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device (811) further comprises presenting the one of the first plurality of advertisements at a third bitrate (408) after the transition. 15 20
14. The method of claim 10, wherein the presenting the second data stream on the display device (811) to transition from displaying the first data stream to displaying the second data stream while the one of the first plurality of advertisements is displayed on the display device (811) further comprises: 25 30
- determining a time point of the one of the first plurality of advertisements displayed at the moment of the transition; and
- presenting the one of the first plurality of advertisements in the second plurality of advertisements starting at the time point after the transition. 35
15. The method of claim 10, wherein the second data stream comprises an Internet Protocol (IP) stream. 40

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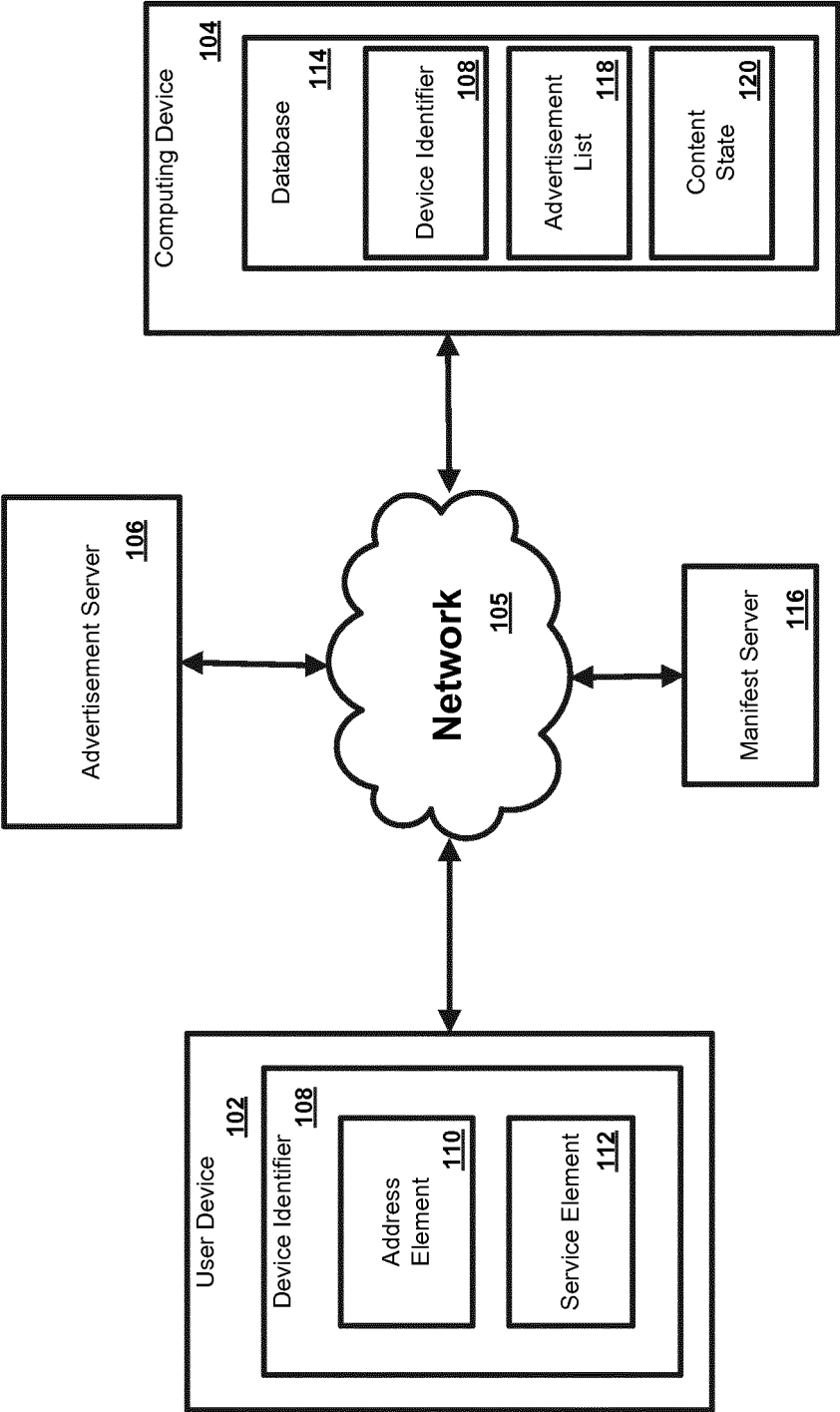


FIG. 1

200A

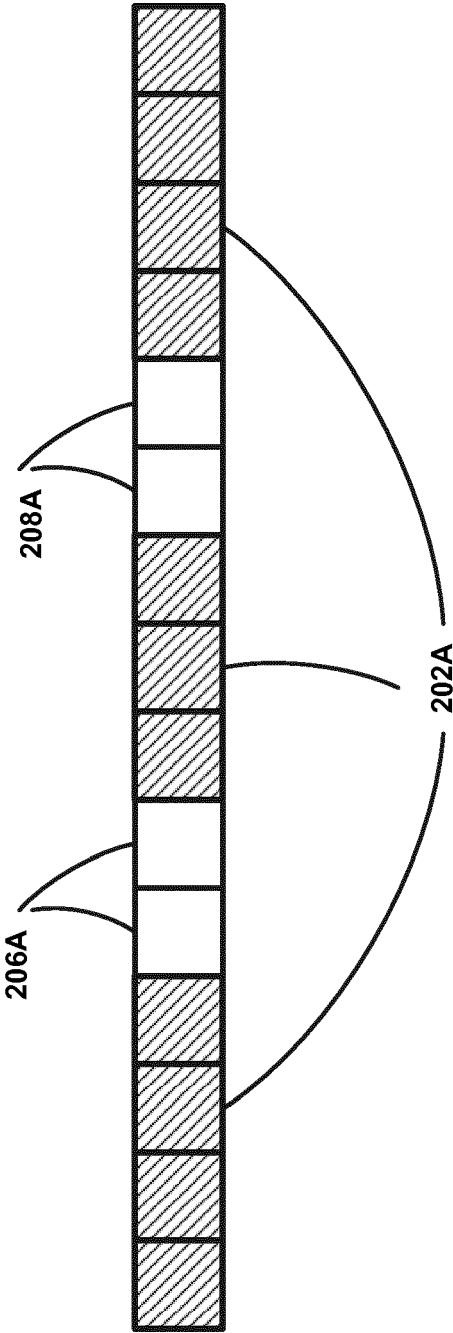


FIG. 2A

↖ 200B

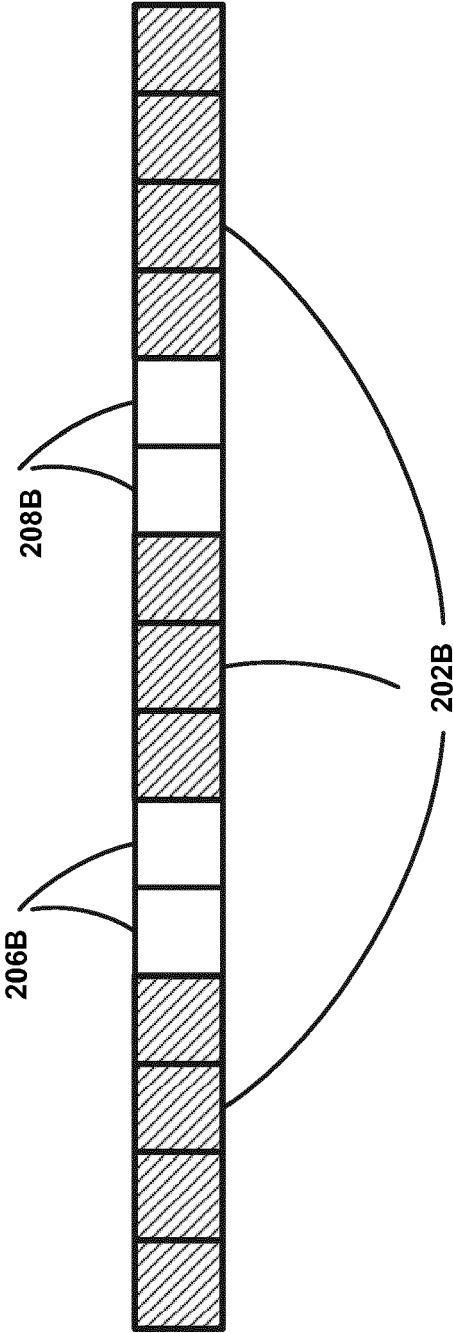


FIG. 2B

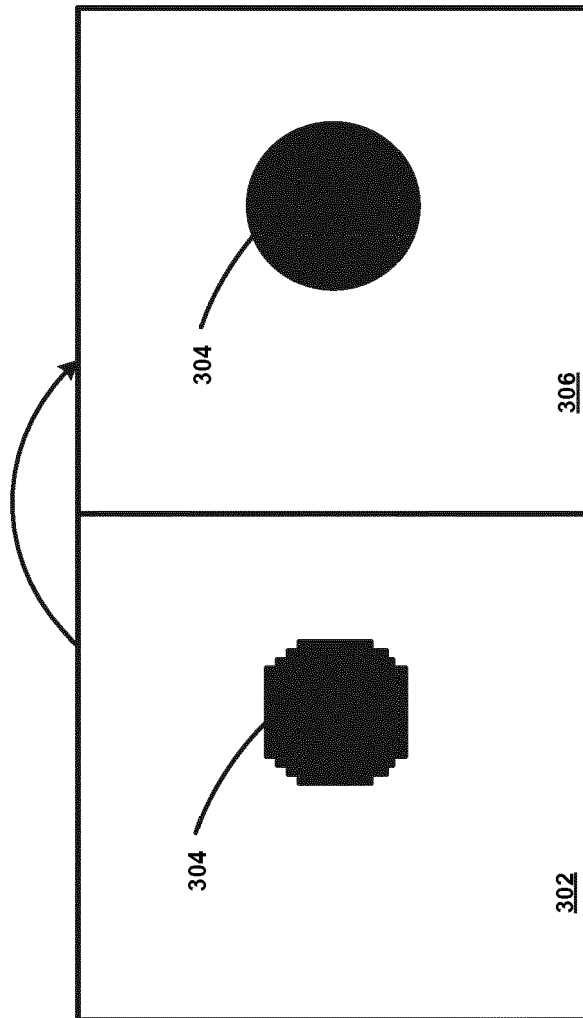


FIG. 3

FIG. 4A

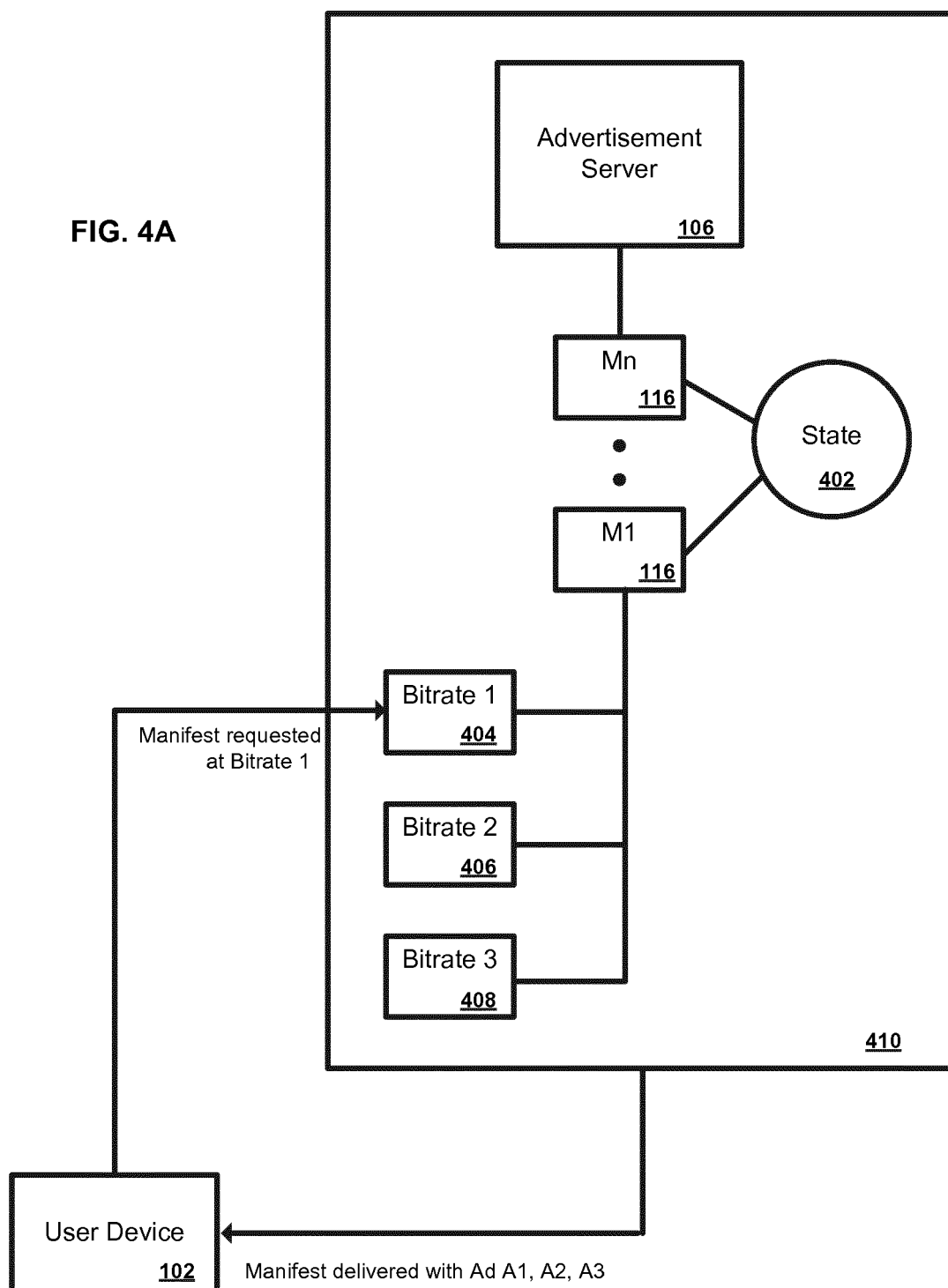


FIG. 4B

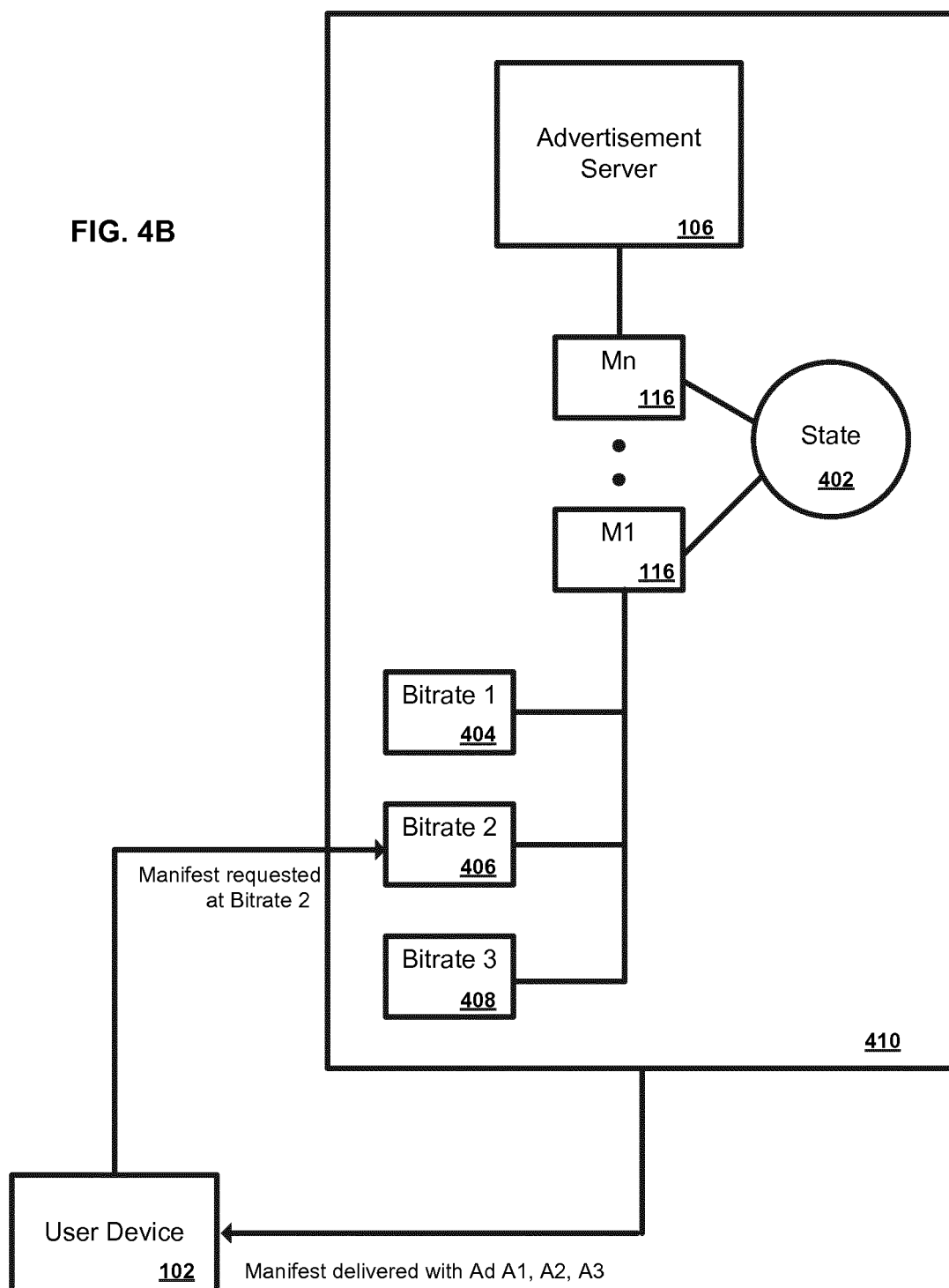


FIG. 5

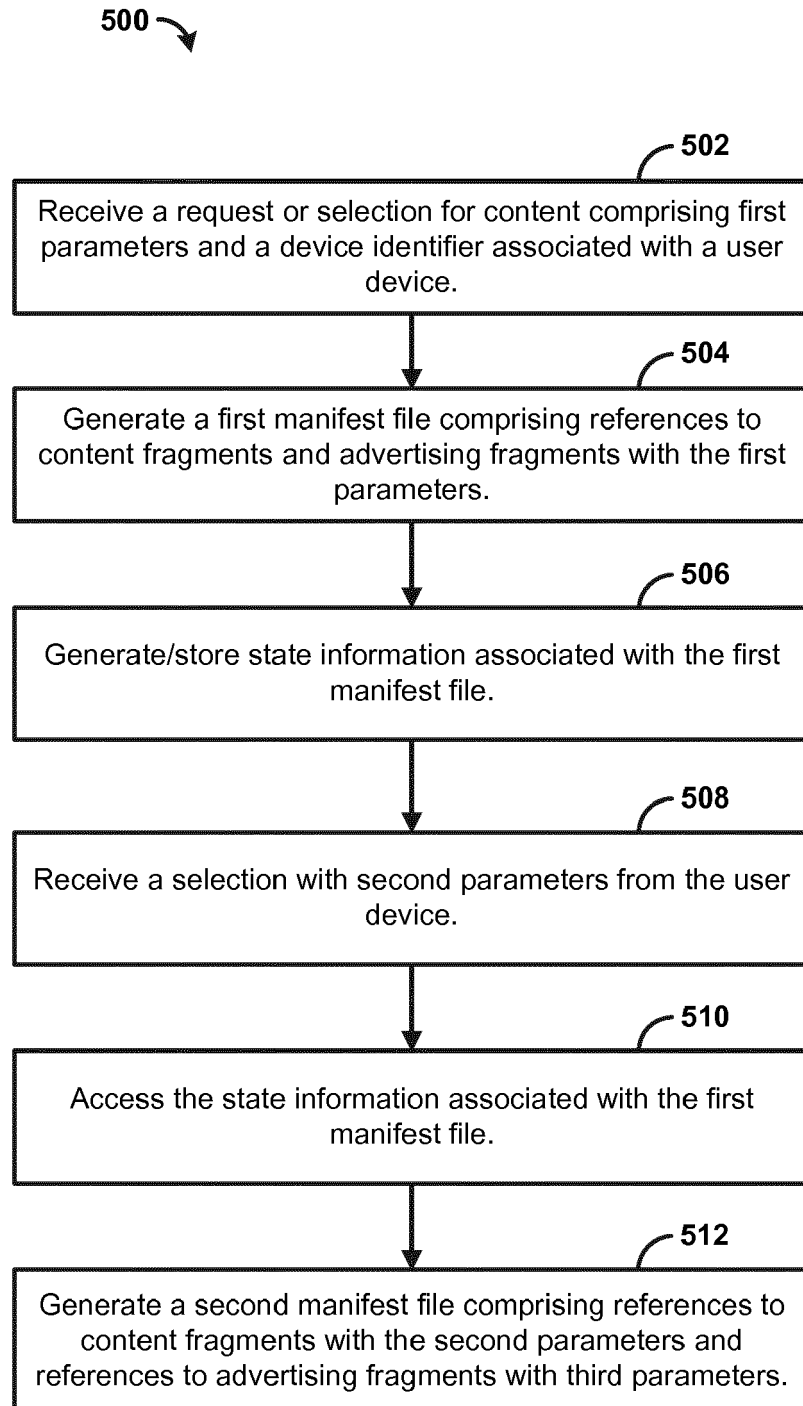


FIG. 6

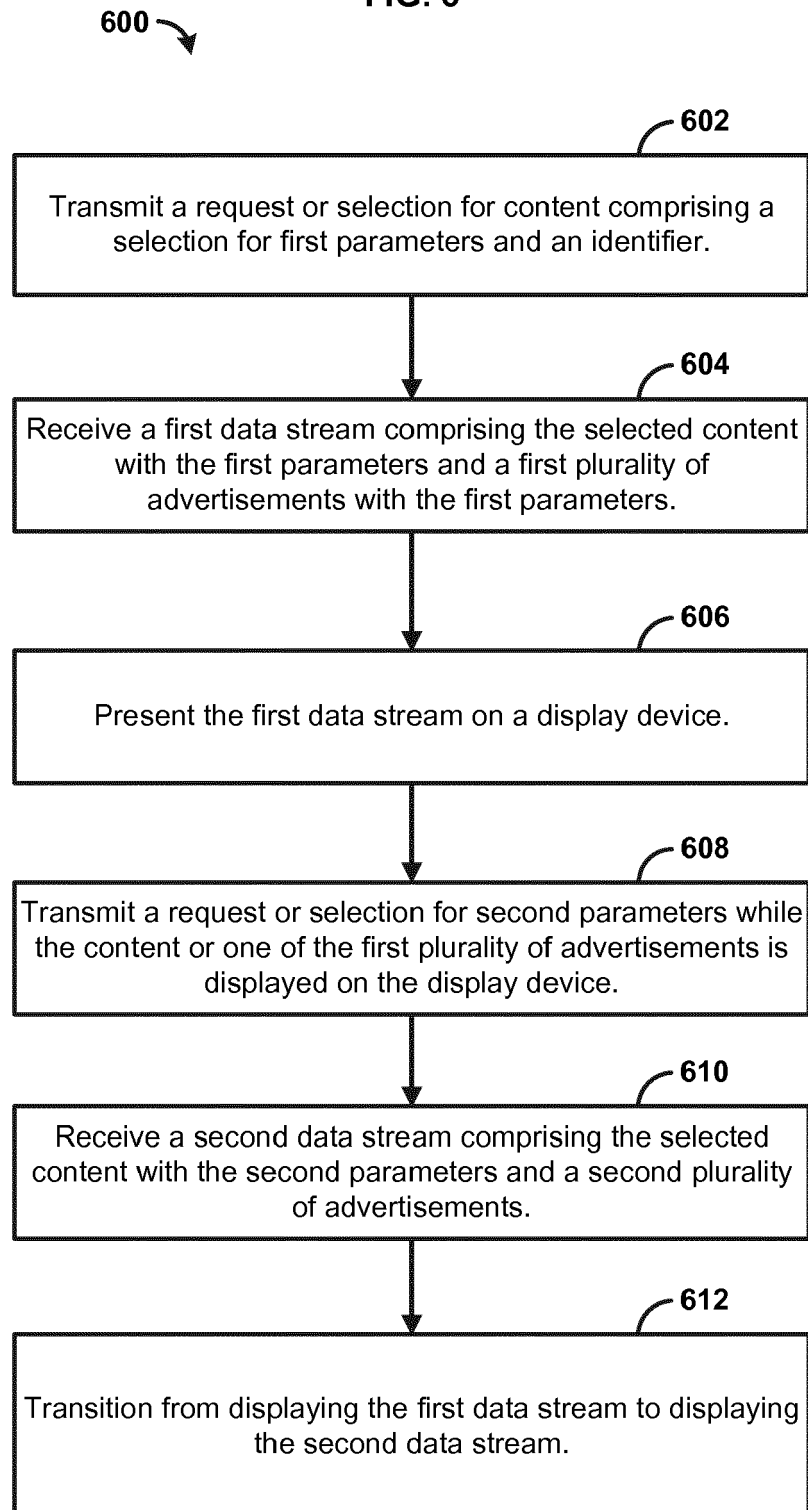
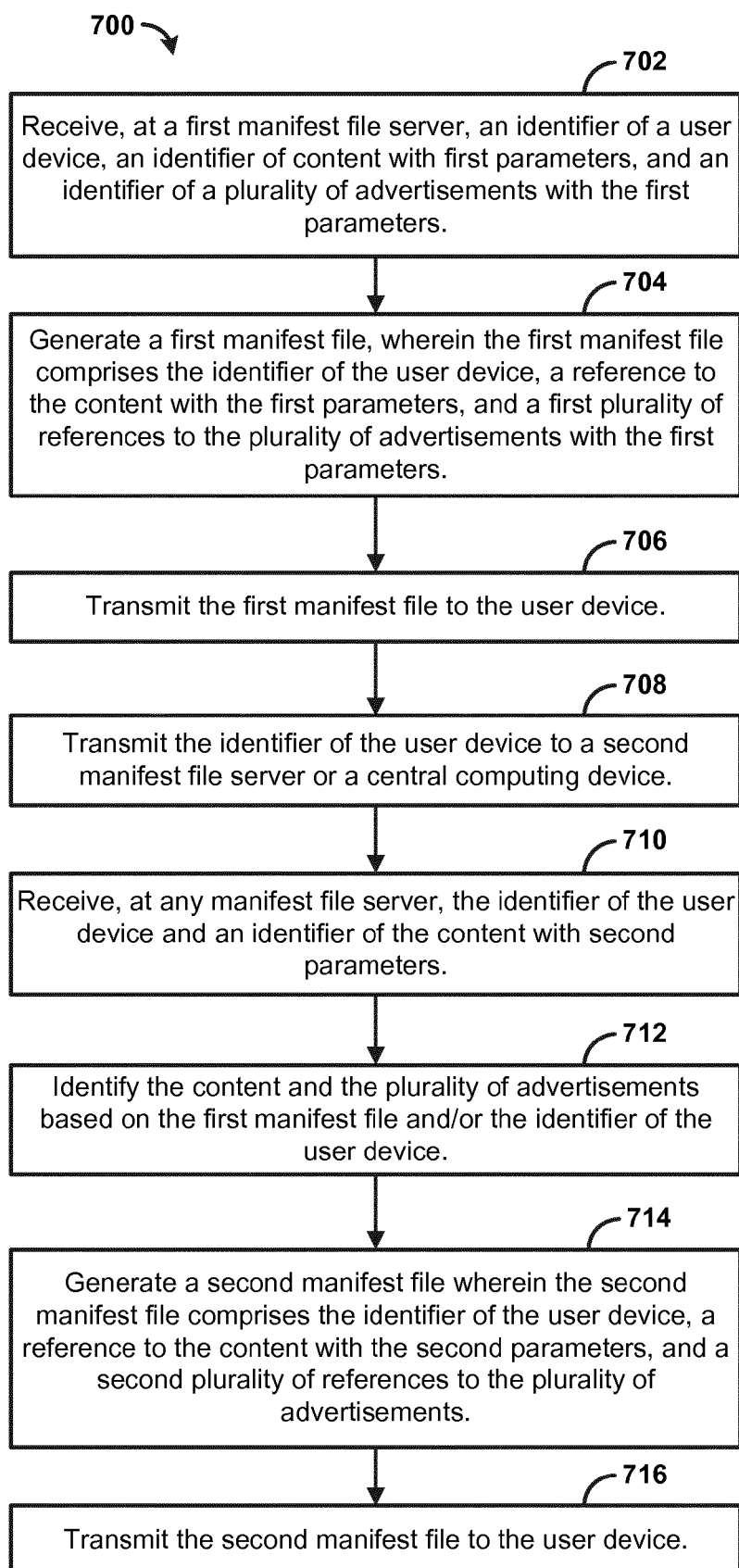


FIG. 7



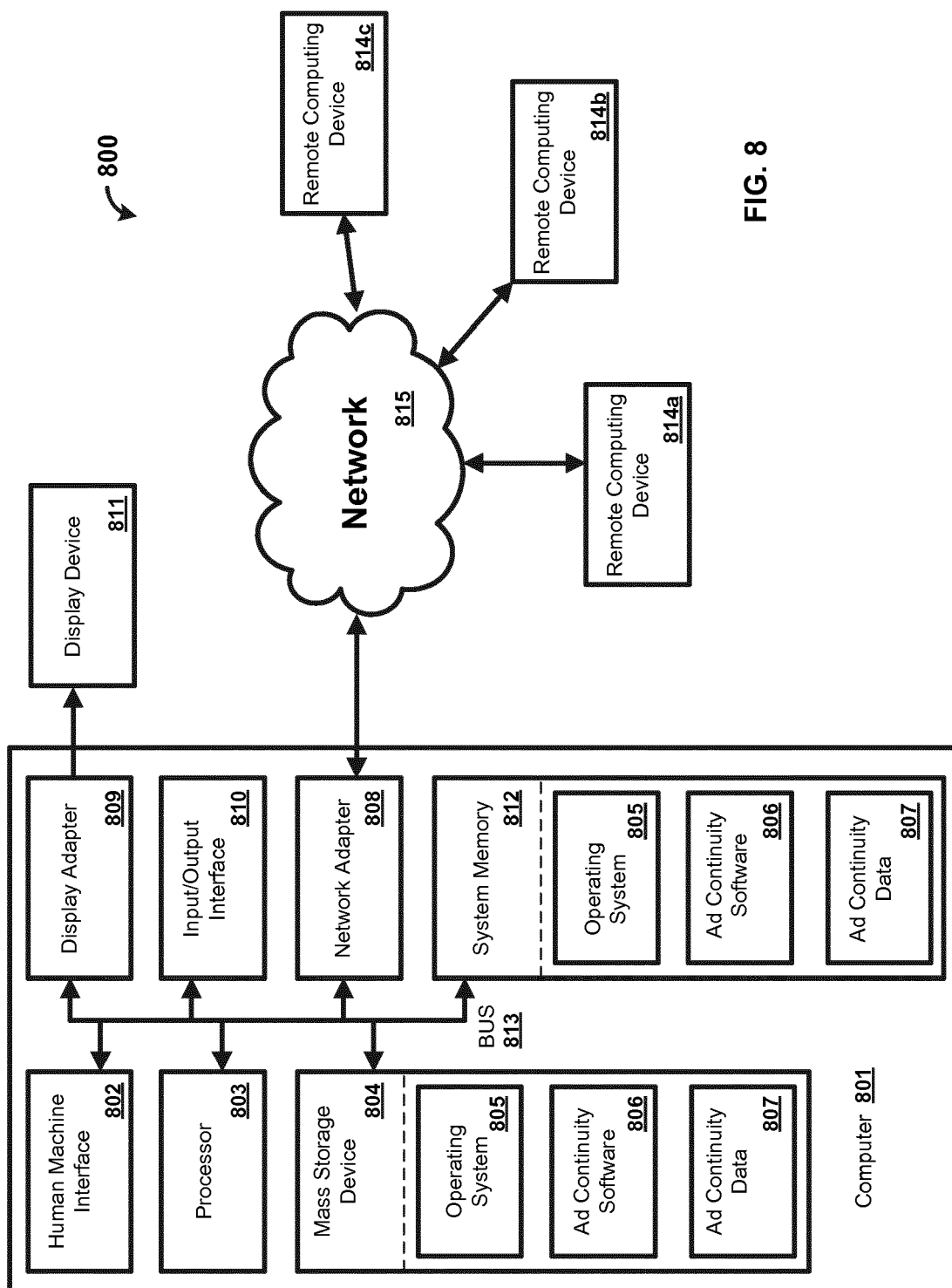


FIG. 8



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 16 2798

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X	US 2014/280688 A1 (MAO WEIDONG [US] ET AL) 18 September 2014 (2014-09-18) * abstract * * paragraph [0001] - paragraph [0004] * * paragraph [0022] * * paragraph [0026] * * paragraph [0029] - paragraph [0030] * * paragraph [0033] - paragraph [0037] * * paragraph [0039] * * paragraph [0044] * * paragraph [0047] - paragraph [0048] * * paragraph [0051] * * paragraph [0063] * * paragraph [0068] *	1-15	INV. G06Q30/02
A	US 2013/151994 A1 (MARCELLA PHILIP [US] ET AL) 13 June 2013 (2013-06-13) * the whole document *	1-15	
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Place of search The Hague		Date of completion of the search 28 June 2017	Examiner Falierou, Christina
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 16 2798

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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28-06-2017

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